What is claimed is:

1. A method for inducing movement of an object, the method comprising:

providing an object comprising a liquid crystal elastomer in contact with a fluid; and

exposing said object to an energy source, whereby said energy source induces a shape change in said object, resulting in movement of said object.

2. The method of claim 1, wherein said liquid crystal elastomer is an organopolysiloxane.

3. The method of claim 1, wherein said energy source is one of a radiative or a conductive energy source.

4. The method of claim 3, wherein said energy source is an electromagnetic radiation source.

5. The method of claim 4, wherein said electromagnetic radiation source is a laser.

6. The method of claim 5, wherein said laser is an Ar laser emitting at 524 nm.

7. The method of claim 1, wherein said object is positioned on a surface of said fluid.

8. The method of claim 1, wherein said fluid is selected from the group consisting of water, ethylene glycol, and mixtures thereof.

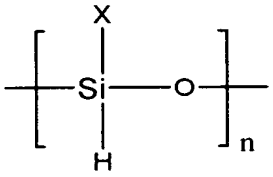
9. The method of claim 1, wherein said object further comprises an azo dye.

10. The method of claim 9, wherein said dye is present in an amount of from 0.01 to 4% by weight of said liquid crystal elastomer.

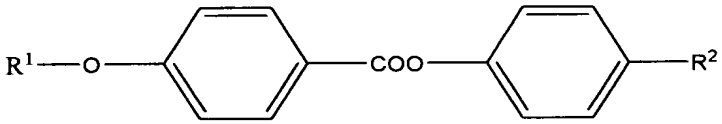
11. The method of claim 1, wherein said liquid crystal elastomer contains pendant mesogenic groups.

12. The method of claim 1, wherein said energy source contracts at least a portion of the object due to a change in the orientation of mesogenic phases in the liquid crystal elastomer.

13. The method of claim 1, wherein said liquid crystal elastomer comprises a polysiloxane having a main chain with the formula



where n is from 20 to 500, and mesogenic pendant side chains having the formula

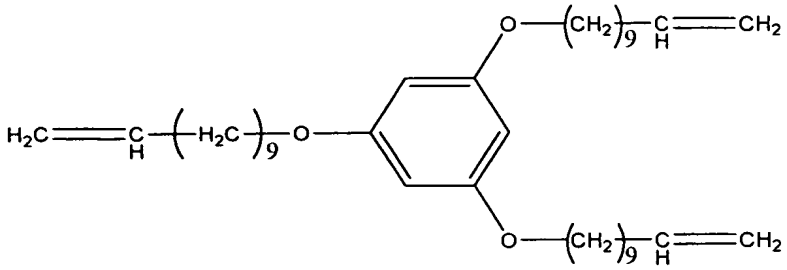


where where R^1 is an alkenyl group and R^2 is selected from the group consisting of alkoxy, cyano, and alkyl groups.

14. The method of claim 1, wherein said liquid crystal elastomer has a crosslink density of from 5 to about 25%.

15. The method of claim 1, wherein said movement of said object is relative to said energy source.

16. The method of claim 1, wherein said liquid crystal elastomer is crosslinked using a compound having the formula



17. An apparatus for producing work, the apparatus comprising a liquid crystal elastomer in contact with a fluid, said liquid crystal elastomer capable of changing shape upon exposure to an energy source.

18. The apparatus of claim 17, wherein said liquid crystal elastomer is held in a fixed position.

19. The apparatus of claim 17, wherein said liquid crystal elastomer undergoes movement in response to said shape change.

20. The apparatus of claim 17, wherein said energy source is an electromagnetic radiation emitter.

21. The apparatus of claim 17, wherein the apparatus is a propulsion system for an object in contact with a fluid.

22. The apparatus of claim 17, wherein the apparatus is a system for moving a fluid.

23. The apparatus of claim 22, wherein the apparatus is a peristaltic pump.

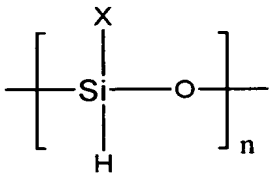
24. The apparatus of claim 17, wherein said liquid crystal elastomer is an organopolysiloxane.

25. The apparatus of claim 17, wherein said liquid crystal elastomer contains pendent mesogenic groups.

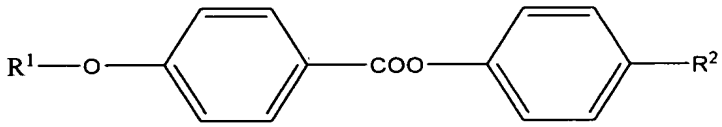
26. The apparatus of claim 17, wherein an azo group containing dye is dispersed in said liquid crystal elastomer.

27. The apparatus of claim 25, wherein said pendent mesogenic group is a biphenyl group.

28. The apparatus of claim 25, wherein said liquid crystal elastomer comprises a polysiloxane having a main chain with the formula



where n is from 20 to 500, and mesogenic pendant side chains having the formula



where where R^1 is an alkenyl group and R^2 is selected from the group consisting of alkoxy, cyano, and alkyl groups.

29. The apparatus of claim 17, wherein said liquid crystal elastomer is tubular in shape.

30. A method for inducing movement of a flexible object in contact with a fluid, the method comprising exposing a flexible object to an energy source, whereby the energy source induces a shape change in the object, resulting in the movement of the object.

31. The method of claim 30, wherein said energy source is a mechanical energy source.